

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT:

- (A) NAME: Prof. Dr. Wolf-Georg Forssmann
(B) STREET: Feodor-Lynen-Str. 31
(C) CITY: Hannover
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(F) POSTAL CODE: 30625

(ii) TITLE OF INVENTION: Insulin-like Growth Factor Binding Protein Fragments and the Utilization Thereof

(iii) NUMBER OF SEQUENCES: 50

(iv) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 34 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

Ala Pro Ser Glu Glu Asp His Ser Ile Leu Trp Asp Ala Ile Ser Thr
1 5 10 15

Tyr Asp Gly Ser Lys Ala Leu His Val Thr Asn Ile Lys Lys Trp Lys
20 25 30
Glu Pro

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

Gly Gly Lys His His Leu Gly Leu Glu Glu Pro Lys Lys Leu Arg Pro
1 5 10 15
Pro Pro Ala Arg Thr Pro
20

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3

Gly Lys Gly Gly Lys His His Leu Gly Leu Glu Glu Pro Lys Lys Leu
1 5 10 15
Arg Pro Pro Pro Ala Arg Thr Pro
20

(A) LENGTH: 35 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: unknown

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

Gly His Ala Lys Asp Ser Gln Arg Tyr Lys Val Asp Tyr Glu Ser Gln
1 5 10 15
Ser Thr Asp Thr Gln Asn Phe Ser Ser Glu Ser Lys Arg Glu Thr Glu
 20 25 30
Tyr Gly Pro
 35

(2) INFORMATION FOR SEQ ID NO: 5:

(A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

Lys Val Asn Gly Ala Pro Arg Glu Asp Ala Arg Pro Val Pro Gln Gly
1 5 10 15
Ser

(2) INFORMATION FOR SEQ ID NO: 6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Leu	Thr	Gln	Ser	Lys	Phe	Val	Gly	Gly	Ala	Glu	Asn	Thr	Ala	His	Pro
1				5				10					15		
Arg	Ile	Ile	Ser	Ala	Pro	Glu	Met	Arg	Gln	Glu	Ser	Glu	Gln	Gly	Pro
				20				25					30		

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 41 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

Pro	Gln	Ala	Gly	Thr	Ala	Arg	Pro	Gln	Asp	Val	Asn	Arg	Arg	Asp	Gln
1				5				10					15		
Gln	Arg	Asn	Pro	Gly	Thr	Ser	Thr	Thr	Pro	Ser	Gln	Pro	Asn	Ser	Ala
				20				25					30		
Gly	Val	Gln	Asp	Thr	Glu	Met	Gly	Pro							
				35				40							

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

Arg	Ile	Glu	Leu	Tyr	Arg	Val	Val	Glu	Ser	Leu	Ala	Lys	Ala	Gln	Glu
1					5				10					15	
Thr	Ser	Gly	Glu	Glu	Ile	Ser	Lys	Phe	Tyr	Leu					
					20				25						

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Gln	Gln	Glu	Leu	Asp	Gln	Val	Leu	Glu	Arg	Ile	Ser	Thr	Met	Arg	Leu
1					5				10					15	
Pro	Asp	Glu	Arg	Gly	Pro	Leu	Glu	His	Leu	Tyr	Ser	Leu	His	Ile	
					20				25					30	

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Arg	Arg	Glu	Met	Glu	Asp	Thr	Leu	Asn	His	Leu	Lys	Phe	Leu	Asn	Val
1				5				10						15	
Leu	Ser	Pro	Arg	Gly	Val	His	Ile								
				20											

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Gln	Ser	Glu	Leu	His	Arg	Ala	Leu	Glu	Arg	Leu	Ala	Ala	Ser	Gln	Ser
1				5				10						15	
Arg	Thr	His	Glu	Asp	Leu	Tyr	Ile	Ile	Pro	Ile					
				20				25							

- (A) LENGTH: 24 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

Arg Arg His Met Glu Ala Ser Leu Gln Glu Leu Lys Ala Ser Pro Arg
1 5 10 15
Met Val Pro Arg Ala Val Tyr Leu
20

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

Arg Arg His Leu Asp Ser Val Leu Gln Gln Leu Gln Thr Glu Val Tyr
1 5 10 15
Arg Gly Ala Gln Thr Leu Tyr Val
20

(2) INFORMATION FOR SEQ ID NO: 14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

Asn Lys Asn Gly Phe Tyr His Ser Arg
1 5

(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

Asp Lys His Gly Leu Tyr Asn Leu Lys
1 5

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

Asp Lys Lys Gly Phe Tyr Lys Lys Lys

1

5

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

Asp Arg Asn Gly Asn Phe His Pro Lys

1

5

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

Asp Arg Lys Gly Phe Tyr Lys Arg Lys

1

5

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

Asp His Arg Gly Phe Tyr Arg Lys Arg
1 5

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

Glu Thr Ser Met Asp Gly Glu Ala Gly Leu
1 5 10

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

Lys Met Ser Leu Asn Gly Gln Arg Gly Glu
1 5 10

(2) INFORMATION FOR SEQ ID NO: 22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

Arg Pro Ser Lys Gly Arg Lys Arg Gly Phe
1 5 10

(2) INFORMATION FOR SEQ ID NO: 23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

His Pro Ala Leu Asp Gly Gln Arg Gly Lys
1 5 10

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

Lys	Pro	Ser	Arg	Gly	Arg	Lys	Arg	Gly	Ile
1				5				10	

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

Arg	Ser	Ser	Gln	Gly	Gln	Arg	Arg	Gly	Pro
1				5				10	

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

Tyr	Pro	Trp	Asn	Gly	Lys	Arg	Ile	Pro	Gly	Ser	Pro	Glu	Ile	Arg	Gly
1				5					10					15	
Asp Pro Asn															

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

Asn	Pro	Asn	Thr	Gly	Lys	Leu	Ile	Gln	Gly	Ala	Pro	Thr	Ile	Arg	Gly
1					5					10				15	
Asp Pro Glu															

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:



(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

Asp Arg Met Gly Lys Ser Leu Pro Gly Ser Pro Asp Gly Asn Gly Ser
1 5 10 15
Ser Ser

(2) INFORMATION FOR SEQ ID NO: 32:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 8 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

Gln Ile Tyr Phe Asn Val Gln Asn
1 5

(2) INFORMATION FOR SEQ ID NO: 33:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

His	Leu	Phe	Tyr	Asn	Glu	Gln	Gln	Glu	Ala	Arg	Gly	Val	His	Thr	Gln
1				5				10					15		
Arg Met Gln															

(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

His	Leu	Phe	Tyr	Asn	Glu	Gln	Gln	Glu
1				5				

(2) INFORMATION FOR SEQ ID NO: 35:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 6 amino acids
- (B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

Tyr Ser Met Gln Ser Lys

1

5

(2) INFORMATION FOR SEQ ID NO: 36:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

His Gln Leu Ala Asp Ser Phe Arg Glu

1

5

(2) INFORMATION FOR SEQ ID NO: 37:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

His Thr Phe Asp Ser Ser Asn Val Glu
1 5

(2) INFORMATION FOR SEQ ID NO: 38:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 6 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

Pro Thr Gly Ser Ser Gly
1 5

(2) INFORMATION FOR SEQ ID NO: 39:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 118 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39:

Ala Pro Ser Glu Glu Asp His Ser Ile Leu Trp Asp Ala Ile Ser Thr
1 5 10 15
Tyr Asp Gly Ser Lys Ala Leu His Val Thr Asn Ile Lys Lys Trp Lys
20 25 30
Glu Pro Cys Arg Ile Glu Leu Tyr Arg Val Val Glu Ser Leu Ala Lys
35 40 45

Gly	Lys	Gly	Gly	Lys	His	His	Leu	Gly	Leu	Glu	Glu	Pro	Lys	Lys	Leu
1				5					10					15	
Arg	Pro	Pro	Pro	Ala	Arg	Thr	Pro	Cys	Gln	Gln	Glu	Leu	Asp	Gln	Val
			20					25					30		
Leu	Glu	Arg	Ile	Ser	Thr	Met	Arg	Leu	Pro	Asp	Glu	Arg	Gly	Pro	Leu
		35					40					45			
Glu	His	Leu	Tyr	Ser	Leu	His	Ile	Pro	Asn	Cys	Asp	Lys	His	Gly	Leu
	50					55					60				
Tyr	Asn	Leu	Lys	Gln	Cys	Lys	Met	Ser	Leu	Asn	Gly	Gln	Arg	Gly	Glu
65					70					75					80
Cys	Trp	Cys	Val	Asn	Pro	Asn	Thr	Gly	Lys	Leu	Ile	Gln	Gly	Ala	Pro
			85						90					95	
Thr	Ile	Arg	Gly	Asp	Pro	Glu	Cys	His	Leu	Phe	Tyr	Asn	Glu	Gln	Gln
			100					105					110		

(B) 7

(C) 9

(D) 1

Gly

[illegible]

(2) INFORMATION FOR SEQ ID NO: 42:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 102 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42:

Lys	Val	Asn	Gly	Ala	Pro	Arg	Glu	Asp	Ala	Arg	Pro	Val	Pro	Gln	Gly	
1				5					10					15		
Ser	Cys	Gln	Ser	Glu	Leu	His	Arg	Ala	Leu	Glu	Arg	Leu	Ala	Ala	Ser	
			20					25					30			
Gln	Ser	Arg	Thr	His	Glu	Asp	Leu	Tyr	Ile	Ile	Pro	Ile	Pro	Asn	Cys	
			35				40					45				
Asp	Arg	Asn	Gly	Asn	Phe	His	Pro	Lys	Gln	Cys	His	Pro	Ala	Leu	Asp	
			50				55				60					
Gly	Gln	Arg	Gly	Lys	Cys	Trp	Cys	Val	Asp	Arg	Lys	Thr	Gly	Val	Lys	
			65			70				75					80	
Leu	Pro	Gly	Gly	Leu	Glu	Pro	Lys	Gly	Glu	Leu	Asp	Cys	His	Gln	Leu	
			85						90					95		
Ala	Asp	Ser	Phe	Arg	Glu											
																100

(2) INFORMATION FOR SEQ ID NO: 43:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 113 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 43:

Leu	Thr	Gln	Ser	Lys	Phe	Val	Gly	Gly	Ala	Glu	Asn	Thr	Ala	His	Pro
1				5					10					15	
Arg	Ile	Ile	Ser	Ala	Pro	Glu	Met	Arg	Gln	Glu	Ser	Glu	Gln	Gly	Pro
			20					25					30		
Cys	Arg	Arg	His	Met	Glu	Ala	Ser	Leu	Gln	Glu	Leu	Lys	Ala	Ser	Pro
			35					40					45		
Arg	Met	Val	Pro	Arg	Ala	Val	Tyr	Leu	Pro	Asn	Cys	Asp	Arg	Lys	Gly
			50					55					60		
Phe	Tyr	Lys	Arg	Lys	Gln	Cys	Lys	Pro	Ser	Arg	Gly	Arg	Lys	Arg	Gly
65					70					75					80
Ile	Cys	Trp	Cys	Val	Asp	Lys	Tyr	Gly	Met	Lys	Leu	Pro	Gly	Met	Glu
				85						90					95
Tyr	Val	Asp	Gly	Asp	Phe	Gln	Cys	His	Thr	Phe	Asp	Ser	Ser	Asn	Val
			100						105					110	
Glu															

(2) INFORMATION FOR SEQ ID NO: 44:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 119 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44:

Pro	Gln	Ala	Gly	Thr	Ala	Arg	Pro	Gln	Asp	Val	Asn	Arg	Arg	Asp	Gln
1					5					10				15	
Gln	Arg	Asn	Pro	Gly	Thr	Ser	Thr	Thr	Pro	Ser	Gln	Pro	Asn	Ser	Ala
			20						25					30	
Gly	Val	Gln	Asp	Thr	Glu	Met	Gly	Pro	Cys	Arg	Arg	His	Leu	Asp	Ser
			35						40					45	

Val	Leu	Gln	Gln	Leu	Gln	Thr	Glu	Val	Tyr	Arg	Gly	Ala	Gln	Thr	Leu
50						55					60				
Tyr	Val	Pro	Asn	Cys	Asp	His	Arg	Gly	Phe	Tyr	Arg	Lys	Arg	Gln	Cys
65					70					75				80	
Arg	Ser	Ser	Gln	Gly	Gln	Arg	Arg	Gly	Pro	Cys	Trp	Cys	Val	Asp	Arg
				85					90					95	
Met	Gly	Lys	Ser	Leu	Pro	Gly	Ser	Pro	Asp	Gly	Asn	Gly	Ser	Ser	Ser
				100				105					110		
Cys	Pro	Thr	Gly	Ser	Ser	Gly									
				115											

(2) INFORMATION FOR SEQ ID NO: 45:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 121 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45:

Gly	Gly	Lys	His	His	Leu	Gly	Leu	Glu	Glu	Pro	Lys	Lys	Leu	Arg	Pro
1				5					10					15	
Pro	Pro	Ala	Arg	Thr	Pro	Cys	Gln	Gln	Glu	Leu	Asp	Gln	Val	Leu	Glu
			20					25					30		
Arg	Ile	Ser	Thr	Met	Arg	Leu	Pro	Asp	Glu	Arg	Gly	Pro	Leu	Glu	His
		35					40					45			
Leu	Tyr	Ser	Leu	His	Ile	Pro	Asn	Cys	Asp	Lys	His	Gly	Leu	Tyr	Asn
		50				55					60				
Leu	Lys	Gln	Cys	Lys	Met	Ser	Leu	Asn	Gly	Gln	Arg	Gly	Glu	Cys	Trp
65					70					75				80	
Cys	Val	Asn	Pro	Asn	Thr	Gly	Lys	Leu	Ile	Gln	Gly	Ala	Pro	Thr	Ile
				85					90					95	
Arg	Gly	Asp	Pro	Glu	Cys	His	Leu	Phe	Tyr	Asn	Glu	Gln	Gln	Glu	Ala
			100					105						110	

Arg Gly Val His Thr Gln Arg Met Gln
115 120

(2) INFORMATION FOR SEQ ID NO: 46:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 105 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46:

Lys	Val	Asp	Tyr	Glu	Ser	Gln	Ser	Thr	Asp	Thr	Gln	Asn	Phe	Ser	Ser	
1				5				10						15		
Glu	Ser	Lys	Arg	Glu	Thr	Glu	Tyr	Gly	Pro	Cys	Arg	Arg	Glu	Met	Glu	
			20					25					30			
Asp	Thr	Leu	Asn	His	Leu	Lys	Phe	Leu	Asn	Val	Leu	Ser	Pro	Arg	Gly	
		35					40					45				
Val	His	Ile	Pro	Asn	Cys	Asp	Lys	Lys	Gly	Phe	Tyr	Lys	Lys	Lys	Gln	
	50						55				60					
Cys	Arg	Pro	Ser	Lys	Gly	Arg	Lys	Arg	Gly	Phe	Cys	Trp	Cys	Val	Asp	
65					70				75						80	
Lys	Tyr	Gly	Gln	Pro	Leu	Pro	Gly	Tyr	Thr	Thr	Lys	Gly	Lys	Glu	Asp	
			85					90						95		
Val	His	Cys	Tyr	Ser	Met	Gln	Ser	Lys								
			100					105								

(2) INFORMATION FOR SEQ ID NO: 47:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 amino acids
- (B) TYPE: amino acid



(ii) MOLECULE type: peptide

(X) Sequences

His Pro Leu His Ser Lys Ile Ile Ile Ile Lys Lys Gly His Ala Lys
1 5 10 15
Asp Ser Gln Arg Tyr
 20

(2) INFORMATION FOR SEQ ID NO: 48:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 135 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48:

```

(x1) SEQUENCE:
Asp Glu Ala Ile His Cys Pro Pro Cys Ser Glu Glu Lys Leu Ala Arg
1          5          10          15
Cys Arg Pro Pro Val Gly Cys Glu Glu Leu Val Arg Glu Pro Gly Cys
          20          25          30
Gly Cys Cys Ala Thr Cys Ala Leu Gly Leu Gly Met Pro Cys Gly Val
          35          40          45
Tyr Thr Pro Arg Cys Gly Ser Gly Leu Arg Cys Tyr Pro Pro Arg Gly
          50          55          60
Val Glu Lys Pro Leu His Thr Leu Met His Gly Gln Gly Val Cys Met
65          70          75          80
Glu Leu Ala Glu Ile Glu Ala Ile Gln Glu Ser Leu Gln Pro Ser Asp
          85          90          95

```

Lys	Asp	Glu	Gly	Asp	His	Pro	Asn	Asn	Ser	Phe	Ser	Pro	Cys	Ser	Ala
			100					105					110		
His	Asp	Arg	Arg	Cys	Leu	Gln	Lys	His	Phe	Ala	Lys	Ile	Arg	Asp	Arg
		115					120					125			
Ser	Thr	Ser	Gly	Gly	Lys	Met									
		130				135									

(2) INFORMATION FOR SEQ ID NO: 49:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 109 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49:

Lys	Phe	Val	Gly	Gly	Ala	Glu	Asn	Thr	Ala	His	Pro	Arg	Ile	Ile	Ser
1			5					10					15		
Ala	Pro	Glu	Met	Arg	Gln	Glu	Ser	Glu	Gln	Gly	Pro	Cys	Arg	Arg	His
			20				25					30			
Met	Glu	Ala	Ser	Leu	Gln	Glu	Leu	Lys	Ala	Ser	Pro	Arg	Met	Val	Pro
		35					40				45				
Arg	Ala	Val	Tyr	Leu	Pro	Asn	Cys	Asp	Arg	Lys	Gly	Phe	Tyr	Lys	Arg
	50					55				60					
Lys	Gln	Cys	Lys	Pro	Ser	Arg	Gly	Arg	Lys	Arg	Gly	Ile	Cys	Trp	Cys
65				70					75				80		
Val	Asp	Lys	Tyr	Gly	Met	Lys	Leu	Pro	Gly	Met	Glu	Tyr	Val	Asp	Gly
			85					90					95		
Asp	Phe	Gln	Cys	His	Thr	Phe	Asp	Ser	Ser	Asn	Val	Glu			
			100					105							

(2) INFORMATION FOR SEQ ID NO: 50:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: unknown

(ii) MOLECULE type: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50:

His Thr Arg Ile Ser Glu Leu Lys Ala Glu Ala Val Lys Lys Asp Arg
1 5 10 15
Arg Lys Lys Leu Thr Gln Ser
20